EOS Mission Support Network Performance Report

May 2002

This is a monthly summary of EMSnet performance testing -- comparing the performance against the requirements.

All results are reported on the web site: (Note correction) http://corn.eos.nasa.gov/performance/Net_Health/EMSnet_list.html. It shows MRTG-like graphs of the performance to various test sites.

Highlights:

- Continued testing through DAAC firewalls:
  - Testing GDAAC → LDAAC, NSIDC, EDC
  - Now testing between GSFC and EDC via vBNS+
    - Through firewalls at GSFC, EDC, NSIDC (not at LaRC yet)
  - Thruput only; no pings or traceroute -- Working with ECS to add them
  - Also testing EDC, LDAAC and NSIDC to GDAAC

- Testing to ERSDAC finally restarted on June 4. New ATM circuit looks OK.

- Testing from GDAAC to PODAAC still inop – need firewall change at PODAAC. However, testing from GSFC-MODIS to PODAAC, and GSFC-CSAFS to JPL-SEAPAC.

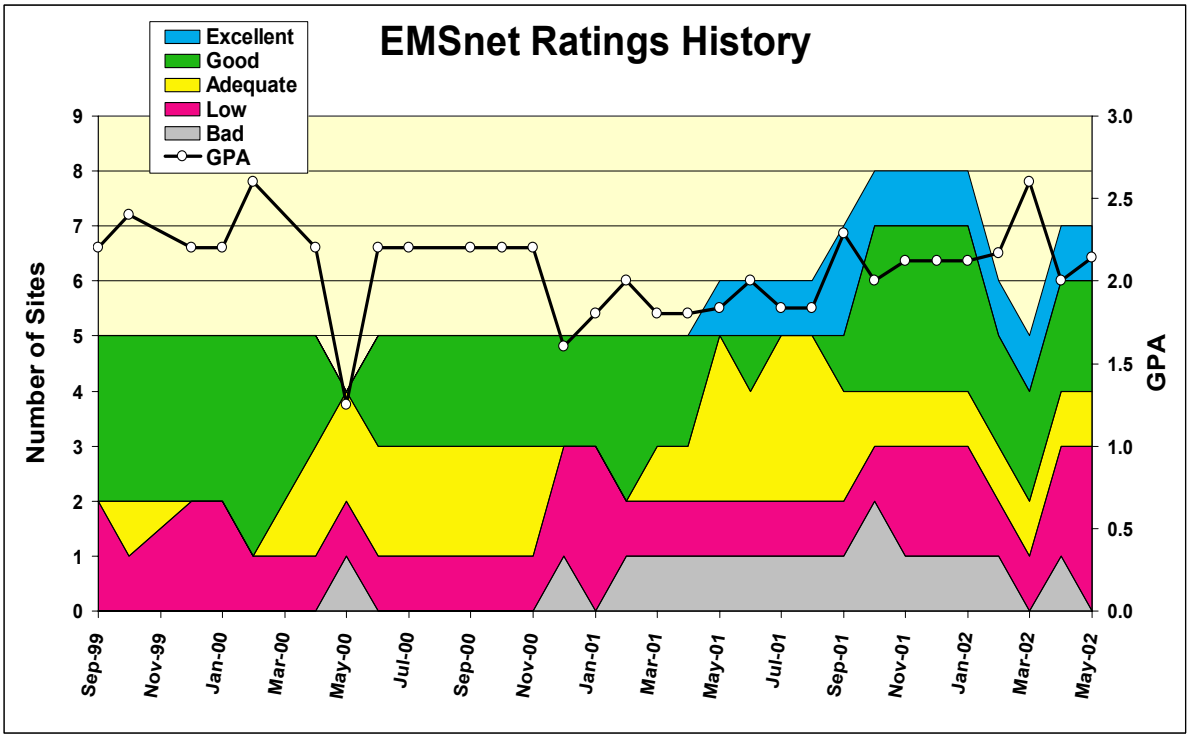
- Trying to initiate new tests from ASF to JPL, and NASDA to NOAA
  - But ASF host having problems
  - NESDIS host datasink down on 2 May

- Now using multiple TCP streams in several cases to overcome window size limitations in firewalls and end nodes – effective in some cases but not others.

- All other continuing tests had stable performance.

Ratings:

The chart below shows the number of sites in each classification since EMSnet testing started in September1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0



Rating Categories:

Excellent: **Total Kbps** > Requirement * 3
Good: 1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate: Requirement < **Total Kbps** < Requirement * 1.3
Low: **Total Kbps** < Requirement.
Bad: **Total Kbps** < Requirement / 3

Where Total Kbps = MRTG + iperf monthly average

Ratings Changes:

Upgrades: ↑

EDC: Bad → Low

Downgrades: ↓: None

Testing Restarted: None

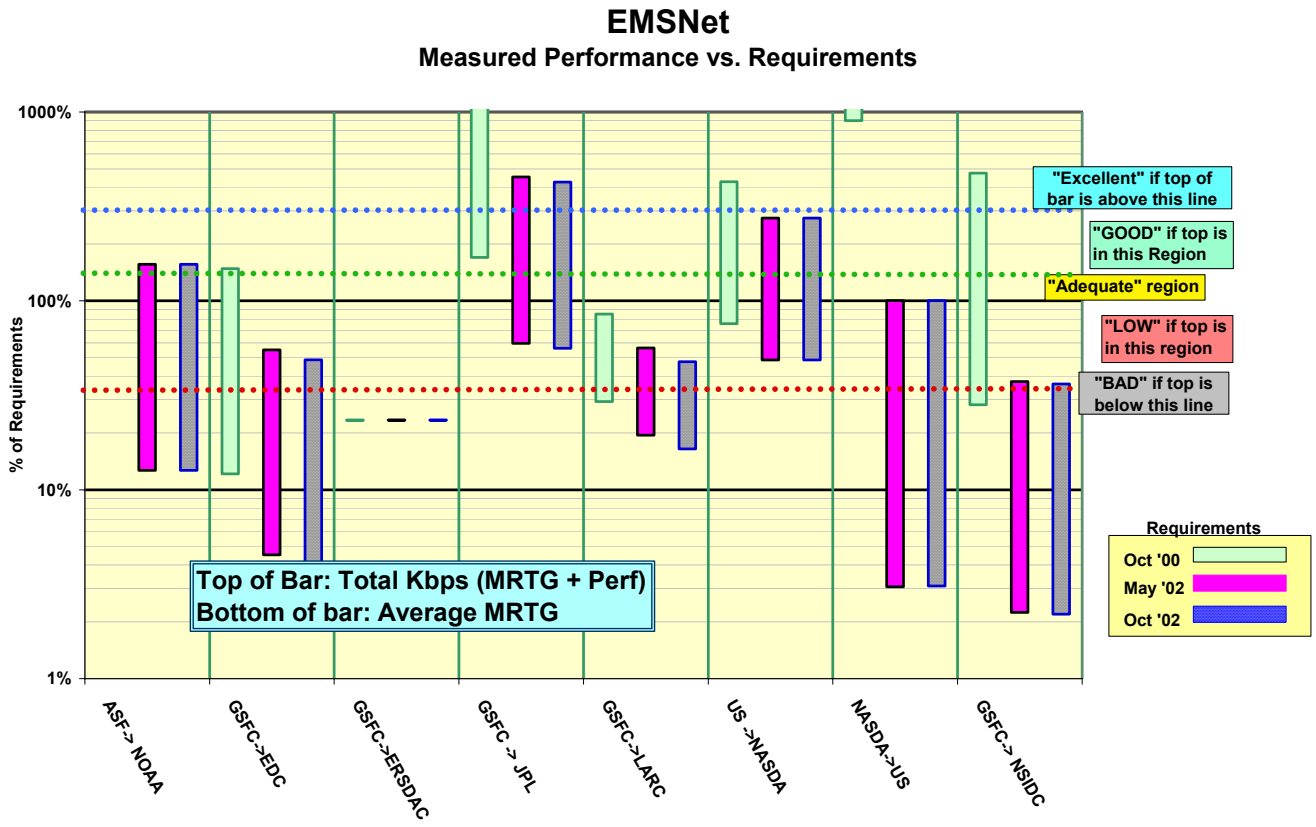
EMSnet Sites:
Network Requirements vs. Measured Performance

May 2002		(kbps)			Testing						
Source -> Destination	Team (s)	Previous (Oct '00)	Current (May '02)	Future (Oct '02)	Source Node : Test Period	MRTG Avg kbps	Perf Avg kbps	Total Avg kbps	Current Status re May '02*	Prev Stat	Current Status re Oct
ASF-> NOAA	ADEOS II	0	1864	1864	ASF->NESDIS: 01-Apr-02 - 02-May-0	236	2676	2912	GOOD	G	GOOD
GSFC->EDC	MODIS, LandSat	82380	221938	250335	GDAAC: 02-May-02 - 28-May-02	10000	112153	122153	LOW	B	LOW
GSFC->ERSDAC	ASTER	275	275	275	Testing Restarted 4-Jun-02	64			N/A	N/A	N/A
GSFC -> JPL	QuikScat, TES, MLS, etc	299	851	906	CSAFS: 01-Apr-02 - 31-May-02	508	3347	3855	Excellent	E	Excellent
GSFC->LARC	CERES, MISR, MOPITT	63036	95277	112800	GSFC: 01-Jan-02 - 28-May-02	18500	35211	53711	LOW	L	LOW
US ->NASDA	QuikScat, TRMM, AMSR	555	863	863	CSAFS: 03-May-02 - 31-May-02	420	1949	2369	GOOD	G	GOOD
NASDA->US	AMSR	0.2	1574	1574	NASDA-EOC: 01-Sep-01 - 31-May-02	48	1530	1578	Adequate	A	Adequate
GSFC-> NSIDC	MODIS	8281	104971	108166	GDAAC: 03-May-02 - 31-May-02	2336	36926	39262	LOW	L	LOW

Notes:	All flow requirements listed are the greater of inflow or outflow						Ratings				
	Flow Requirements (from BAH) include TRMM, Terra , Aqua, QuikScat, ADEOS II						Summary		vs May '02		vs Oct '02
									Score	Prev	Score
*Criteria:	Excellent	**Total Kbps** > Requirement * 3					Excellent		1	1	1
	GOOD	1.3 * Requirement <= **Total Kbps** < Requirement * 3					GOOD		2	2	2
	Adequate	Requirement < **Total Kbps** < Requirement * 1.3					Adequate		1	1	1
	LOW	**Total Kbps** < Requirement					LOW		3	2	3
	BAD	**Total Kbps** < Requirement / 3					BAD		0	1	0
	Change History:	27-Sep-99	Original - TRMM, Terra, and QuikScat					Total	7	7	7
		19-Jan-01	Incorporated BAH requirements including additional missions								
		9-Apr-01	Updated BAH requirements					GPA	2.14	2.00	2.14
		4-Jun-01	Added 50% contingency to BAH requirements								
		16-Nov-01	Added MRTG to Iperf, updated requirements, Revised criteria								

Comparison of measured performance with Requirements:

This graph shows three bars for each destination. Each bar uses the same actual measured performance, but compares it to the requirements for three different times (Oct '00, Mar '02, and Oct '03). Thus as the requirements increase, the same measured performance will be a bit lower in comparison.



Note that the interpretation of these bars has changed from Sept '01. The bottom of each bar is the average measured MRTG flow to that site (previously daily minimum). Thus the bottom of each bar can be used to assess the relationship between the requirements and actual flows. Note that the requirements include a 50% contingency factor above what was specified by the projects, so a value of 66% would indicate that the project is flowing as much data as requested.

Details on individual sites:

1) ASF → CONUS:

Rating: Continued **Good**

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
ASF → NESDIS	2699	2676	865	236	2912
ASF → GSFC-CSAFS	2748	2498	1111		

Requirements:

Source → Dest	FY	mbps	Rating
ASF → NESDIS	'02, '03	1.86	**Good**

Comments: Thruput steady, but NESDIS host datasink stopped 2 May, and ASF host became erratic 21 May. Also, about a week of MRTG outage in Mid-May. The 2.9 mbps total is about as expected for a 2 * T1 (3.1 mbps) circuit with competing flows. Since this is more than 30% over the April '02 requirement, the rating is "Good"

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2) GSFC → EDC:

Rating: ↑ **Bad** → Low

Test Results:

Test Period	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
02-May-02 – 27 May 02	153.5	112.1	14.8	10.0	123.6
28-May-02 – 2 June 02	166.5	115.2	54.2	N/A	

Requirements:

Date	mbps	Rating
May '02	222	**Low**
Oct '02	250	**Low**

Restored GDAAC → EDC testing through firewall on 30 April. Firewall imposes a window size limitation, so began using multiple streams on 2 May. Thruput much better than any previous testing in this configuration, but MRTG showed little utilization (also had 1 week MRTG outage in Mid May). Does not appear that the MRTG counters are currently overflowing – it's possible with peaks over 100 mbps, based on 32 bit counters and a 5 minute sampling interval. This performance below the requirement, but greater than 1/3 of the requirement, so is rated "LOW".

On 28 May, the EDC circuit was switched to vBNS+. Initial testing shows about the same median thruput, with peaks improved somewhat, and the daily worst improved a great deal. MRTG is not yet available on this circuit.

The similarity of these performance levels suggests the limit is other than in the network; perhaps the hosts themselves, of the firewalls.

3) GSFC → ERSDAC: Rating: Continued N/A

GSFC → ERSDAC Test Results:

Test Period	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
1-Mar-01 - 19-Jan-02	446	430	200	54	487

The Iperf performance was stable until Jan 19, when the GSFC DAAC firewall stopped further testing. Testing has resumed in June – using new 1 mbps ATM connection -- looks OK From MRTG, the user flow averages now about 64 kbps.

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → ERSDAC	'02, '03	275	**N/A**

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4) JPL: Rating: Continued **Excellent**

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
GSFC-CSAFS → JPL-SEAPAC	3836	3347	1839	508	3855
LaRC DAAC → JPL-TES	3752	3372	2622		
GSFC DAAC → JPL-TES	20783	13025	3820		
GSFC-MTVS1 → JPL-PODAAC	3852	32909	1512		
NASDA-EOS → JPL-SEAPAC	2431	2411	1461		

Requirements:

Source → Dest	Date	mbps	Rating
GSFC-CSAFS → JPL-SEAPAC	May '02	550	**Excellent**
	Oct '02	906	**Excellent**
LaRC DAAC → JPL-TES	Oct '02	2050	**Good**

The rating is now based on testing from CSAFS at GSFC to SEAPAC at JPL. Note that the MRTG flows to JPL include flows from all GSFC and LaRC sources, and also include flows destined to NASDA and ASF. The measured performance rates as "Excellent" compared with the Feb. '02 ICESAT requirement of 550 kbps. Other GSFC and LaRC sources have similar performance, all limited by the NISN GSFC→JPL VC configuration.

On May 8, the route from GDAAC to JPL-TES switched to NISN SIP. Performance improved substantially as a result. However, it is not clear whether this is the intended route for this flow.

NASDA → JPL-SEAPAC testing began 21 March 02. The 2.4 mbps typical thruput shows that the NASDA circuit is working well.

ASF → JPL-SEAPAC testing is not working – apparently due to firewall blocking. Still working with both ends to resolve.

Testing from GSFC-DAAC to JPL-PODAAC requires a firewall change at PODAAC due to the firewall installation at GSFC; has been requested.

5) GSFC → LaRC: Rating: Continued Low

Test Results:

Test Period	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
28-May-02 - 31-May-02	51.4	49.5	41.7	13.4	62.9
9-Apr-02 - 28-May-02	41.0	35.2	25.3	18.5	53.7
23-Jan-02 - 7-Apr-02	44.1	36.1	22.4	12.2	48.3
1-Jan-02 – 19-Jan-02	40.8	35.0	32.1	7.5	42.5

Requirements:

Date	mbps	Rating
May '02	95	Low
Oct '02	113	Low

Testing to LaRC was moved back to GDAAC (from MTVS1 since 23 Jan) due to enabling of testing through GDAAC firewall. Performance from GDAAC was similar to both MTVS1 tests, and GDAAC pre-firewall tests, so the GSFC firewall does not seem to have had an impact on this performance.

Starting 29 May, multip[le TCP streams were used, to ensure that the firewall window size was not a limitation. This improved and stabilized performance, but is still below the requirement.

6A) US (GSFC) → NASDA: Rating: Continued Good

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
GSFC-CSAFS → NASDA-EOC	2232	1949	673	420	2369

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → NASDA	'02, '03	863	Good

Testing since Jan 19 done from GSFC-CSAFS, after installation of firewall at GSFC DAAC, blocking testing. Began using multiple TCP streams on May 3, to overcome the window size limitation of the NASDA test host. Performance improved to 2.3 mbps peaks (was 1.6), about as expected for a 3 mbps ATM PVC. However, rating is still “Good”.

6B) NASDA → US (GSFC):

Rating: Continued **Adequate**

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
NASDA-EOC → GSFC-CSAFS	1655	1530	808	48	1578

Requirements:

Source → Dest	FY	kbps	Rating
NASDA → GSFC	'02, '03	1570	**Adequate**

Since the requirement jumped from 0.2 kbps In Oct. '00, this performance is above the requirement, but not with a 30% margin, so is rated "Adequate". Again, performance appears limited by the NASDA machine window size.

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7) NSIDC:

Rating: N/A → **Low**

GSFC → NSIDC Test Results:

Test Period	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
3-May-02 - 31-May-02	49.8	36.9	24.1	2.3	39.2
8-Apr-02 - 2-May-02	52.0	38.6	12.0	2.2	40.8
31-Oct-01 - 12-Jan-02	12.1	11.5	0.6	3.5	15.0

Requirements:

Date	mbps	Rating
April '02	105	**Low**
Oct '02	108	**Low**

Testing to NSIDC from GDAAC via EMSnet resumed 8 April (it had stopped Jan 12 due to the installation of the ECS firewalls). There is no way to compare this to the pre-firewall configuration, since the circuit was changed while the testing was down for firewall installation. However, using multiple parallel TCP sessions did not appear to improve the overall thruput (its only effect appears to be raising the daily worst value – by grabbing a bigger share of the congested link).

Other Testing:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	Requirement	Rating
JPL → NSIDC-SIDADS	2601	2355	2121	260	**Excellent**
LDAAC - NSIDC	3716	3212	2702		

Performance is very stable, and appears limited by a NISN VCs.
